

Tornadoes, Apr. 15, 1921, Arkansas and Texas.

Place.	Time (p. m.).	Direction of movement.	Width of destructive path.	Clouds.	Winds.	Direction trees lay on—			Killed.	Injured.	Damage estimated.	Remarks.	Information furnished by—
						N. side.	Center.	S. side.					
Mineola, Wood County, Tex.	12:45	SW-NE...	100 feet....	Funnel shaped.	Rotary...	.....	.....	.....	.....	1	.....	2 houses destroyed, 6 houses damaged.	Postmaster, Mineola, Tex.
Avinger, Cass County, Tex.	2:50	From 37½° west of S towards 37½° east of N.	400 to 600 yards.	do.....	do.....	S.....	Twisted mass.	N.....	8	44	.....	22 landowners, 16 tenants suffered loss.	Mrs. J. L. Stephenson, secretary Avinger storm-relief committee.
Bowie County, Tex.....	3:30	SW-NE...	½ mile.....	do.....	do.....	SE.....	Generally NW.	NE.....	2	.....	.....	.....	Henry Humphrey, Four State Press, Texarkana, Ark.
Strip 25 miles in length through Miller County, Ark.	4:30	SW-NE...	½ mile.....	.....	Rotary, regular twister.	SE.....	NE.....	NW.....	16	50	\$150,000	Damage estimate does not include crop damage.	F. F. Quinn, secretary Red Cross Committee, Texarkana, Ark.
Strip through Hempstead County, about 40 miles.	5:00	SW-NE...	½ to 1½ miles.	.....	.....	NE.....	NE.....	NE.....	100	.....	1,000,000	Most destructive have ever seen results from.	N. P. O'Neal, Hope, Ark.
2½ to 3 miles southeast of Washington, Hempstead County.	5:00	SW-NE...	do.....	.....	.....	(*)	(*)	(*)	7	30	30,000	Everything in path destroyed.	Rosa Wallace, postmistress, Washington, Ark.
11 miles southeast of Columbus, Hempstead County, Ark.	5:00	SW-NE...	½ mile.....	.....	.....	SE.....	All directions.	NW.....	.....	.....	.....	Heavy hail 3 to 4 miles on west side; light hail at Columbus; barometer at Columbus fell 0.10.	R. C. Stuart, Columbus, Ark.
1½ miles east of Blevins, Hempstead County.	5:20	SW-NE...	½ to 1½ miles.	Funnel shaped.	Rotary...	SE.....	do.....	NW.....	9	34	\$200,000	57 residences destroyed, 75 residences damaged, 41 barns destroyed.	W. O. Beene, Blevins, Ark.
Mount Pisgah, Pike County.	.....	S-NE.....	½ mile.....	.....	.....	(*)	(*)	(*)	1	24	50,000	.....	H. W. Guise, postmaster, Delight, Ark.
Pike City, Pike County	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	H. M. Lintz, Pike, Ark.
Gravelly, Yell County..	3:30	SW-NE...	125 yards.	.....	.....	S-SW.	NE.....	NE.....	1	15	50,000	.....	Thos. B. Frizzell, postmaster, Gravelly, Ark.
Danville, Yell County	4:20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Newspaper reporter. Do.
Chickiah Mountain, Yell County.	5:00	SW-NE...	200 yards.	.....	Straight blow.	(*)	(*)	(*)	4	6	.....	Considerable damage.	J. A. Jones.
1½ miles northwest of Appleton, Pope County.	8:18	SW-NE...	.....	.....	.....	.....	.....	.....	.....	5	.....	7 homes destroyed, stock killed.	Max Malschowski.
Marche, Pulaski County.	8:45	SW-NE...	300 feet....	Funnel shaped.	Rotary...	.....	.....	.....	.....	.....	2,500	Buildings damaged.	J. C. Cook.

<sup>1</sup> About.<sup>2</sup> Every direction.<sup>3</sup> \$25,000 crops.<sup>4</sup> All directions.<sup>5</sup> No storm; clouds black, heavy rain; leaves, etc., scattered through vicinity.<sup>6</sup> Storm passed over too high to do damage.

## LOCAL STORMS IN MISSISSIPPI.

By R. T. LINDLEY, Meteorologist.

[Weather Bureau, Vicksburg, Miss., June 6, 1921.]

Violent local storms traversed portions of seven counties of Mississippi during the night of April 15-16 or on April 16. On account of the storms occurring during the night, mostly, funnel-shaped clouds, characteristic of the tornado, were not observable, although the destruction wrought, the accompanying sounds, and the directions in which debris were scattered gives basis for the belief that some, if not all, the storms may have been true tornadoes.

One, on the night of the 15th-16th, passed over a portion of the course laid waste by the tornado of March 16, 1919, from near Grace, Issaquena County, to the vicinity of Pantherburn, in Sharkey County, with heavy resultant damage, but, fortunately, without loss of human life. One person was killed and 10 were injured in portions of Noxubee and Lowndes Counties during the early morning of the 16th, and considerable damage was done, at about the same time, without loss of human life, near Hazlehurst, Copiah County. On April 16, 1 person was killed and 15 were injured by a violent local storm, characterized by observers as a tornado, in the southwestern portion of Kemper County, in the vicinity of Rio. Also, at about the same time, extensive prop-

erty damage resulted, with injuries to 10 persons, from the occurrence of a local storm in the vicinity of the New Zion settlement, in the eastern portion of Amite County.

Three local storms, doing considerable damage, occurred on the afternoon of April 26. Two, affecting portions of Copiah and Lincoln Counties, were of relatively slight importance, but the third practically demolished Braxton, a town of about 300 population, in Simpson County, leaving but two buildings standing, causing the death of 15 persons and serious injuries to 23. From all accounts this storm was of true tornado type.

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THE TORNADOES OF APRIL 16, 1921, IN ALABAMA.<sup>1</sup>

By P. H. SMYTH, Meteorologist, and J. W. SMITH, Observer.

## WEATHER CONDITIONS AT 7 A. M.

A disturbance of considerable intensity centered in the middle Mississippi Valley, with a comparatively wide trough of low pressure extending southward to the Gulf of Mexico. A marked temperature gradient existed between Cairo, Ill., and Columbia, Mo., and freezing ex-

<sup>1</sup> Full details of these storm have been compiled and are on file at the offices of the U. S. Weather Bureau, Washington, D. C., and Montgomery, Ala.

tended as far south as the Texas Panhandle. Temperatures in Alabama ranged from 62° at Florence to 72° at Mobile. Shortly before 7 a. m. the towns of Ralph, Tuscaloosa County, and Pushmataha, were struck by tornadoes, and the northwestern counties of the State were recovering from the effects of the tornado that devastated portions of that section just after midnight. (See weather maps on p. 255.)

#### GENERAL SUMMARY OF THE FIVE TORNADOES.

At least five separate tornadoes are believed to have occurred in the State on the 16th, the first beginning at midnight and the last ending about 2.15 p. m. These tornadoes, together with the severe local thundersqualls and torrential rains that accompanied them and occurred elsewhere in the State, did enormous damage. Definite estimates are difficult to make, but it is known that not less than 13 persons were killed, more than 50 injured, and not less than \$1,000,000 damage was done. Most of this damage was the result of the tornadoes, and was restricted to limited stretches in their paths, but the damage over wide areas to fences, trees, outbuildings, etc., by the thundersqualls, to roads, streets, plowed fields, etc., by the washing rains; and to culverts, bridges, crops, etc., by the freshets that followed is known to have been considerable. It is thought that complete information would materially add to the estimate of damage given.

Many interesting facts are brought out by the accompanying map (fig. 1) which shows the times of beginning and ending of rainfall and the location of the paths of the tornadoes. The tornadoes are seen to skirt the southeastern edge of the rain area in every case except the Gallion storm, which was the most local of the five. This strengthens the statements usually made that heavy rainfall does not precede tornadoes. A marked southeastward extension of the rain area is noted between 6 a. m. and 8 a. m., and 12 noon and 2 p. m.: during these four hours two of the tornadoes were in progress. There is a noticeable change in the direction of the tracks toward the east as the day advanced and the low moved northeastward. It is noted that tornado tracks, in recent years at least, seem to show a more easterly direction in southeastern Alabama than in the northwestern part of the State.

A chart of all available wind directions reported by cooperative observers (fig. 2) shows that no important variations in wind direction obtained at 7 a. m., the winds being generally south or southeast. At Montgomery there was no permanent shift of the wind to the northwest until the morning of the 17th, although there was the usual temporary shift accompanying the thundersquall. Stratus clouds at Montgomery were from the southwest throughout the 16th, and it would seem likely that there was an overflow of the wind-shift line of the low to the southeastward at a moderate elevation. It is not believed that the wind-shift line at the surface reached Alabama.

The distribution of rainfall over Alabama is shown by figure 3. An attempt has been made to adjust the data to a midnight-to-midnight total, the time of beginning and ending of precipitation being utilized to accomplish this as far as possible. Six areas of 4 inches or more of precipitation are shown. In most cases these lie to the southeast of one of the tracks of the tornadoes. The last tornado traversed a section where less than 2 inches of rain fell, although rainfall in the immediate track of this storm was reported very heavy, being estimated at

between 3 and 4 inches in the section northwest of Wetumpka.

An interesting feature connected with the tracks of the first and last of the tornadoes is that they follow the same general tracks as the Marion County tornado of April 20, 1920, and the Deatsville-Agricola and West Point tornado of March 28, 1920. (See fig. 4.)

#### TORNADOES IN TENNESSEE ON APRIL 16, 1921.

By R. M. WILLIAMSON, Meteorologist.

[U. S. Weather Bureau, Nashville, Tenn., May 27, 1921.]

A depression over the central Mississippi Valley was attended by heavy rainfall with much thunder and lightning and severe local storms in Tennessee during the night of the 15-16th. (See weather maps, figs. 1 and 2, p. 255.) The greatest damage resulted in the south-central counties, where several tornadoes occurred about 4 a. m.

One was first observed 5 miles southwest of Lynnville, Giles County, from which place it moved northeastward to Gileston, 1 mile south of Lynnville, and thence into Marshall County, spending its force, apparently, near Mooresville, a few miles northeast of Lynnville. At Gileston 36 empty freight cars were more or less wrecked, entailing a loss of about \$10,000. Just east of Lynnville several dwellings and many outhouses were blown down, a child was killed, and a number of persons were injured. Along other parts of its course of 12 miles or more there was much damage to houses, trees, fences, etc. The total damage from this storm was about \$35,000.

Another tornado passed through Cornersville, in the southern part of Marshall County, about 4 a. m., destroying much property and injuring twelve or fifteen persons, one of whom died several days later. The loss in this vicinity was said to be about \$30,000. The storm next appeared near Palmetto, Bedford County, where barns, trees, and fences were blown down but no serious damage occurred. There were sections along its course several miles in length where the storm evidently lifted, as the destruction was slight. It is very probable that this storm continued northeastward into Rutherford County, becoming active again in the vicinity of Dennis and Readyville, where many houses were partially wrecked about 5 a. m. If this be true, the distance covered during the hour was about 45 or 50 miles. The total loss was probably not less than \$50,000.

The observer at Coldwater, in the southwestern part of Lincoln County, reports considerable property destroyed and several persons seriously injured in a tornado that passed 2 miles north of that station.

About 9 a. m. of the same date, the town of Newport, Cocke County, in the eastern part of the State, was struck by a tornado, moving from west to east and cutting a path 50 feet wide along Main Street. Damage to shade trees, houses, automobiles, wires, etc., amounted to five or six thousand dollars. The comparatively small damage was due to the fact that the storm's path was narrow and, apparently, did not reach the residences and other buildings. Few persons were out of doors, due to a heavy rain falling, and only three were injured. After traversing four city blocks the storm lifted and struck again in the timber east of the town.

Tornadoes occur much less frequently in east Tennessee than in the western half of the State. It is interesting to note in this connection that two previous storms of this character occurred in the vicinity of Newport, according